

Undiagnosed Peripartum Cardiomyopathy: Hemodynamic Abnormalities During Emergency Cesarean Section *

Acil Sezeryan Sırasında Hemodinamik Bozukluklarla Ortaya Çıkan Tanı Almamış Peripartum Kardiyomyopati Olgusu

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SUMMARY

A 32-year-old woman was admitted to the operating room for emergency cesarean section. Preoperative blood pressure was 132/85 mmHg and heart rate was 188/min. Under general anesthesia, at the 25th minute of the operation, arterial blood pressure could not be measured, peripheral pulses could not be palpated, and peripheral oxygen saturation was unmeasurable. Her heart rate was 160-180/min. Peripheral circulation was collapsed and cyanosis occurred. Bolus 25 mg ephedrine was applied, and 500 mlt colloid and 1000 mlt crystalloid were given immediately. Because of hypotension, anaphylaxis was suspected, and 1 ampoule diphenhydramine and 250 mg methylprednisolone were applied together with another 25 mg ephedrine. Despite the infusion of a total of 4000 mlt crystalloid and 1000 mlt colloid, arterial pressure remained pressor-dependent. Arterial blood gas analysis was as follows: pH: 7.18, pCO₂: 38, pO₂: 220, lactate: 6.0, base deficit: -9, HCO₃: 19 mEq/L, and central venous pressure (CVP): +25 mmHg. Hypotension remained; dopamine 15 mcg/kg/min was started. Under dopaminergic support, invasive arterial blood pressure increased to 100/70 mmHg. The patient was transferred to the intensive care unit (ICU) mechanically ventilated with dopamine infusion of 15 mcg/kg/min. ECG showed supraventricular tachycardia (SVT), but was unremarkable for ischemia or underlying conduction abnormality. Postoperative chest X-ray showed bilateral interstitial infiltrates and enlarged cardiac silhouette. Noradrenaline infusion at 1.5 mcg/kg/min and furosemide infusion at 10 mg/h were started. Ventilation/perfusion scintigraphy failed to diagnose pulmonary embolism. An echocardiogram was performed and demonstrated 32% ejection fraction, systolic left ventricular dysfunction, and left atrial and ventricular dilatation. Thus, underlying peripartum cardiomyopathy was considered to be the most likely diagnosis. On the 3rd day in the ICU, the patient was weaned from the ventilator; and noradrenaline infusion was stopped. Echocardiogram performed three months later showed normalization of ejection fraction to 45%.

Key words: Emergency; decompensation; general anesthesia; cardiomyopathy; caesarean section.

ÖZET

Otuz iki yaşında, gravida 4 parite 2 abortus 1 gebe, sefalopelvik uyumsuzluk ve fetal distress nedeniyle acil sezeryan operasyonu na alındı. Preoperatif tansiyon arteriyel 132/85 kalp hızı: 188/dk idi, genel anestezi altında sezeryan operasyonu planlandı. Operasyonun 25. dakikasında tansiyon alınamamaya, periferik nabızlar filiform hale gelmeye ve siyanoz belirmeye başladı. Kalp hızı 160-180/dk idi. Periferik dolaşımın bozulduğu fark edildi ve 25 mg efedrin iv puşe yapıldı, sıvı resüsitasyonu hızlandırıldı. 500 mlt kolloid ve 1000 mlt izotonik hızlıca verildi, hipotansiyon devam etmekteyken anafilaktoid reaksiyondan şüphelenildi ve 1 amp difenhidramin ve 250 mg metil prednizolon iv puşe yapıldı, bu arada efedrin 25 mg iv puşe tekrarlandı. Toplamda 3000 mlt kristalloid ve 1000 mlt kolloid replasmanına yanıt vermeyen hastaya dopamin 15 mcg/kg/dk başlandı. Arteriyel kan gazı analizinde ph: 7.18, pCO₂: 38, pO₂: 220, lact: 6.0, base deficit: -9, HCO₃: 19 mEq/Lt. idi. Santral ven basıncı +25mmHg ölçüldü. İnotrop destek altında tansiyon arteriyel 100/70 mmHg alınması üzerine hasta entübe halde yoğun bakım ünitesine nakledildi. 12 derivasyonlu EKG'de supraventriküler taşikardi saptandı ancak iskemi ya da ileti anormalliği lehine bir bulgu saptanmadı. Çekilen akciğer grafisinde kardiyotorasik oranın arttığı ve akciğerlerde yüklenme ile uyumlu bilateral infiltrasyonlar görüldü. Kardiyak dekompanzasyon düşünülerek 10 mg/h furosemid infüzyonu ve 1.5 mcg/kg/dk noradrenalin infüzyonu başlandı. Ventilasyon perfüzyon sintigrafisinde pulmoner emboli lehine bulgu saptanmayan hastanın yapılan ekokardiyografisinde ejeksiyon fraksiyonu (EF) %32, sol ventrikül sistolik disfonksiyonu ve sol atriyal ve ventriküler dilatasyon saptanması ile peripartum kardiyomyopati tanısı düşünüldü. Yoğun bakım takibinin üçüncü gününde hasta mekanik ventilatörden ayrıldı ve inotrop destek kademeli olarak azaltıldı. Üçüncü aydaki kontrol ekasında EF'si %45 saptandı.

Anahtar sözcükler: Acil; dekompanzasyon; genel anestezi; kardiyomyopati; sezeryan.

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CASE REPORT

A-32-year old, 70 kg, gravida 4 paravida 2 abortus 1 woman was admitted to the operating room for emergency cesarean section because of cephalopelvic disproportion and fetal distress. Anaesthetic assessment confirmed that she had never undergone general anesthesia, there was no family history of anesthetic problems, had no known allergies. She had a medication for hyperthyroidism; propylperazole per a day but she had no abnormalities in her blood analyses and she was eutyroid. In her physical examination she was dyspneic, orthopneic and pretibial edema was 3+/3+ other cardiovascular and respiratory examination had no abnormalities. In view of extremely poor CTG trace, the decision was taken to proceed immediately cesarean section under general anesthesia.

Non-invasive arterial blood monitoring, ECG and pulse oximetry was commenced before preoxygenation. Arterial blood pressure was 132/85 mmHg and heart rate was 188/min (sinus tachycardia). The patient remained in a left tilt supine position at all times. Mallampathy score was 2. A standard rapid sequence induction was performed using 450 mg penthal sodium, 40 mg rocuronium bromide with cricoid pressure. Tracheal intubation was achieved easily using an 7.0 mm cuffed oral tube which was clearly seen to pass between the cords. The patient's lungs were initially ventilated manually using the circle system with a fresh gas flow of nitrous oxide 3 litre/min, oxygen 3 litre/min and 2% sevoflurane. Correct placement of tracheal tube was confirmed and the capnograph displayed a normal end tidal carbon dioxide trace. Systolic blood pressure was almost 125 mmHg, diastolic blood pressure was 65 mmHg, oxygen saturation was 100% and heart rate 160-180/min until full term male infant was delivered at 5th min of the operation. Apgar scores of 5 for 1 and 5 min. and consultant pediatrician started to manipulate the baby. After deliver the baby 100 microg dose of fentanyl was added.

Approximately the 25th min of the operation noninvasive arterial blood pressure could not be measured, peripheral pulses could not be palpated, pharyngeal and peripheral oxygen saturation was un-

measurable. Heart rate was still 160-180/min from the beginning. Peripheral circulation was collapsed and cyanosis occurred. At this time all anesthetic gases were stopped, manually ventilated with 100% oxygen and lung examination was normal. Bolus 25 mg ephedrine was applied, fluid resuscitation was fastened, 500 ml colloid and 1000 ml crystalloid was given to the patient immediately. Because of hypotension was not corrected, heart rate and peripheral circulation collapse was same, anaphylaxis was suspected; diphenhydramine and 250 mg methylprednisolone was applied both another 25 mg iv ephedrine. Despite the infusion of a total of 4000 ml crystalloid 1000 ml colloid infusion and peripheral vasoconstrictor, arterial pressure remained pressor dependent. Total peroperative blood loss was 500 ml and urine was 300 ml. Invasive radial arterial and right internal jugular vein catheterization was inserted. Arterial blood gas analysis was as follows: pH: 7.18, pCO₂: 38, pO₂: 220, lactate: 6.0, base deficit: -9 and HCO₃: 19 mEq/L. Central venous pressure (CVP) was +25 mmHg. Hypotension was remained despite over adequate filling pressures; dopamine 15 mcg/kg/min was started initially. Under dopaminergic support, invasive arterial blood pressures got increase to 90-100 mmHg systolic and 60-70 mmHg diastolic, peripheral pulses were palpable and heart rate decreases to 160 beat/min. Patient transferred to intensive care unit (ICU) mechanically ventilated with dopamine infusion 15 mcg/kg/min, under sedation and paralysis.

Elective intermittent positive ventilation was continued in the intensive care unit and the patient was sedated with remifentanyl and midazolam. When the patient admitted to the ICU, invasive arterial blood pressure is 90/60 mmHg. Heart rate is 160/min., 3 lead ECG on monitor was supraventricular tachycardia, 12-lead ECG was unremarkable for ischemia or underlying conduction abnormality, a right bundle branch block was seen in some ECG tracings. Central venous pressure was +23 mmHg. An immediate postoperative chest radiograph was remarkable for widespread bilateral interstitial infiltrates and a grossly enlarged cardiac silhouette. Instead of dopamine infusion; noradrenaline infusion was started at rate of 5 mcg/kg/min, added to furosemide infusi-

on 10 mg/h to improve urine output for reduce volume overload. A ventilation-perfusion lung scan was interpreted as being incompatible with the diagnosis of pulmonary embolism. An echocardiogram performed and demonstrated 32% ejection fraction (EF), systolic left ventricular dysfunction, severe mitral and middle tricuspid regurgitation, left atrial and ventricular dilatation, and systolic global hypokinesis. So an underlying peripartum cardiomyopathy was felt to be the most likely diagnosis. According to cardiology consultation, because of supraventricular tachycardia resists on, digoxine was applied. On the 3rd day in the ICU, patient was weaned from the ventilator, and noradrenalin infusion was reduced and stopped on the following day, patient was more stable hemodynamically like arterial blood pressure was 120/75 heart rate was 140/min, CVP: +12 mmHg.

She was transferred from ICU to cardiac care unit. In cardiac care unit; appropriate medication for heart failure was ordered with b blocker, furosemide, spironolactone, ace inhibitors and digoxine. Follow-up echocardiogram three months later showed normalization of EF 45% (Fig. 1).

DISCUSSION

Diagnostic criteria, which were subsequently confirmed by consensus of the participants in the “Peripartum Cardiomyopathy: National Heart Lung and Blood Institute and Office of Rare Disease Workshop (2000)”. The criteria include (a) development of CHF secondary to decreased left ventricular systolic function in the last month of pregnancy or within 5 months after delivery; (b) absence of pre-existing cardiac dysfunction; (c) absence of determinable ca-

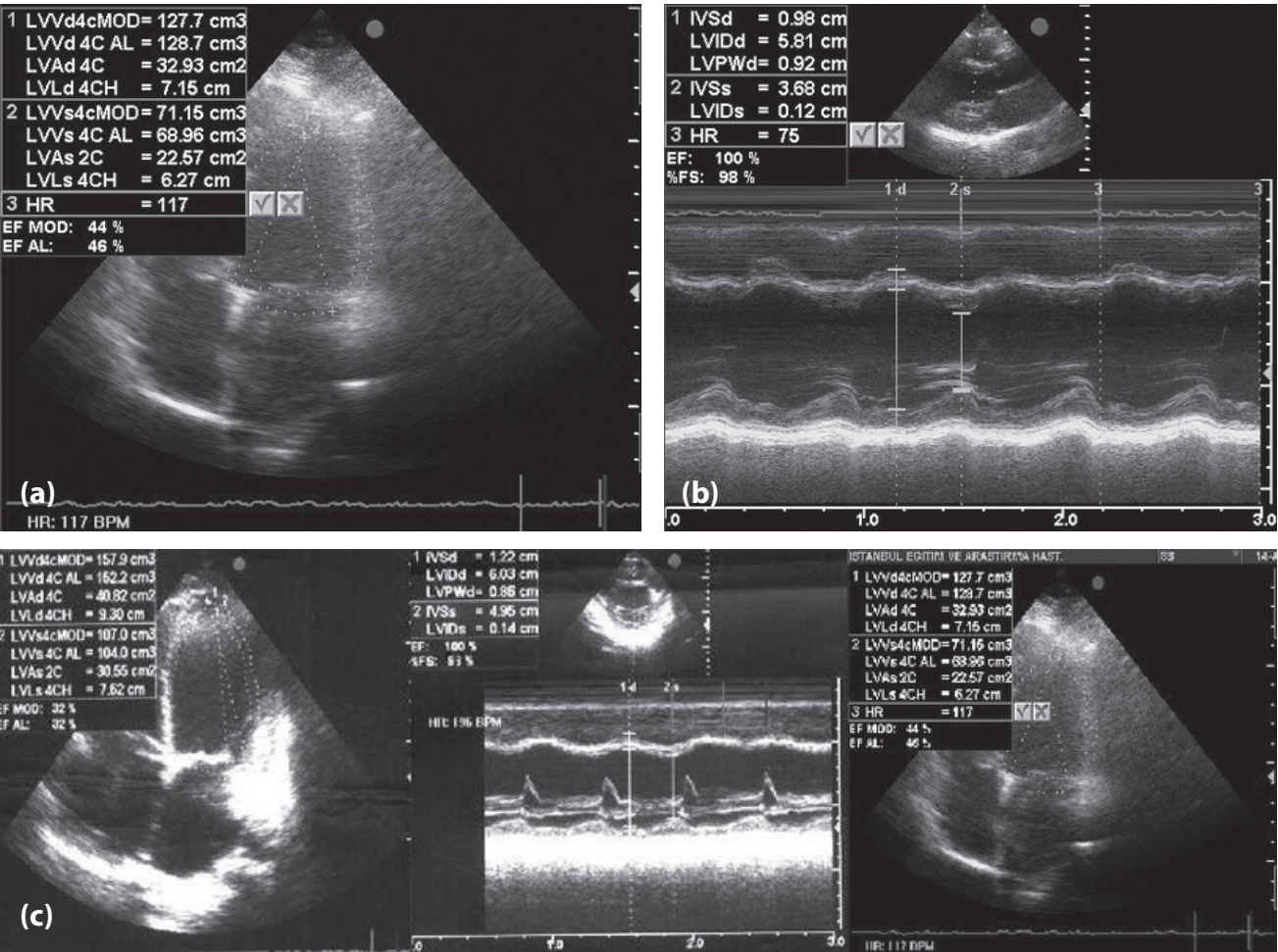


Fig. 1. (a, b) 3rd month echocardiograms, and (c) comparison of the echocardiograms.

use of cardiomyopathy; and more recently, (d) left ventricular systolic dysfunction demonstrated by classic echocardiographic criteria: EF less than 45%, or M-mode fractional shortening less than 30%, or both, and end-diastolic dimension more than 2.7 cm/m². The optimum anesthetic technique for cesarean section patients with peripartum or other forms of congestive cardiomyopathy is controversial and both general and regional anesthesia described.^[1] A single-shot spinal technique is not recommended because the rapid hemodynamic changes associated with this technique may not be well tolerated in these fragile patients. General anesthesia is sometimes required when cesarean section is required because of nonreassuring fetal status or acute maternal decompensation. Induction and maintenance with a high-dose opioid technique is often preferred. If this technique is used, remifentanyl is a good choice because

its short half-life can minimize depressant effects on the neonate.

Collaboration among the obstetrician, cardiologist, and anesthesiologist is essential to optimize care. Parturients with peripartum cardiomyopathy require special anesthetic care during labor and delivery. This case is unusual in that it presented at the time of emergency caesarean section as both sinus tachicardia and inotrop dependent hypotension. The patient had been completely asymptomatic in the antenatal period.

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